

Agri-food chains and sustainability of water resources

Involving actors from resource development to resource management ?

Illustration of ground water irrigation development
in Maroc (Saiss) and France (Beauce)

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Photo: M. Kuper



Water, a critical resource for Agri-food sector

- Irrigated agriculture: 40% of world's food supply
70% of total water withdrawals
- Increasing pressure on water resource especially groundwater
30% of total irrigation area
expansion in arid, semi arid and temperate regions x10 1960-2010

Over-exploitation of many aquifers: India, China, MENA, US...

10% of world food supply

- How does agri food chain actors (suppliers, farmers, industries...) are involved in groundwater irrigation development ?
- Can they participate in sustainable resource management?

How to avoid the boom and bust cycle of «groundwater economies »

=> case studies Saiss boom and Beauce aquifer regulation

Effects of irrigation development

At farm level

- Intensification, increase and stabilization of yields traditional crops
- Crop diversification more sustainable cropping pattern
- Adoption of high value crops vegetables, fruits, seeds...

Opportunities at agri-food chain level

- Regularity of commodity supply, enhance secured contracts
- Meet the requirements of markets for qualitative segmentation of products higher technical specifications
- New supply basin for agro-industries
- Increased outlets for input suppliers

Groundwater individual pumping: a flexible and secured access to water

In India, best poverty alleviation mean (Shah) in phase1 « rise » & 2 « boom »

... but not sustainable without resource management

Groundwater resource development & vegetable chain “boom” in Saiss- North Maroc

- **Aquifer** 2000 km² 45.000 ha irrigated rise 80's boomed en 2000's
shift from rainfed cereals & olive to onions 9000 ha (x10), potatoes, fruits
water abstraction 440 Mm³ /year individual pumping
- **Social & économique impacts** strong upstream & downstream chain effects:
vegetable producers: 4000
suppliers: 100
collectors, trade intermediaries: 2000

Value of production farm stage: 400 M\$ consumer stage: 1.200 M\$ x3

- **key factors** of this vegetable rise & boom
 - high demand of domestic market for fruits & vegetables
 - public policies with liberalization of land titles & subsidies for irrigation
 - free access to groundwater & low cost of development tubewell & pumps
 - Involvement of equipment & inputs suppliers: provide credit, technical support & innovation (drip irrigation...)

Groundwater resource development & sustainable issue in Saiss- North Maroc

- Groundwater over exploitation

mean recharge deficit 100 Mm³/year uncertain stock

water table drop -60 m 1990-2010

end of the boom phase and likely imminent decline

- Attempt to address resource management

- a public basin agency put in charge of the aquifer management
- rules on ban of new drilling ...but with no real implementation
- lack of concertation and plan of action with local stakeholders

No implication of agri chains actors despite their involvement in irrigation practices.

Resource management of Beauce aquifer, implication for supply of agro-industries

- Water resource & irrigation development

- 1980's dry period supplementary irrigation for cereals and sugar beet
- diversification in high value crops: potatoes, onions, beans, seeds
- quality upgrading for high value wheats, malt barley

=> *convergence of farms & agro-industries (some newly settled)* 300.000 ha irrigable
250 to 450 Mm3

- Water resource management measures

1990's boom in irrigation and decrease in aquifer level

1st contract for aquifer in France agreement Public water manager & Farmers org
quota of 420 Mm3 individual allocation to 3600 irrigators yearly adjusted

=> *In restricted years, competition between industries for water resource
cropping pattern decision of diversified farmers put at risk their supply*

=> associate industries in water management concertation

Resource management of Beauce aquifer,

Integrate the agri-food chain stakes in water management process

5 Chains competing for the water resource with different stakes of irrigation: economic & organisational impacts of irrigation

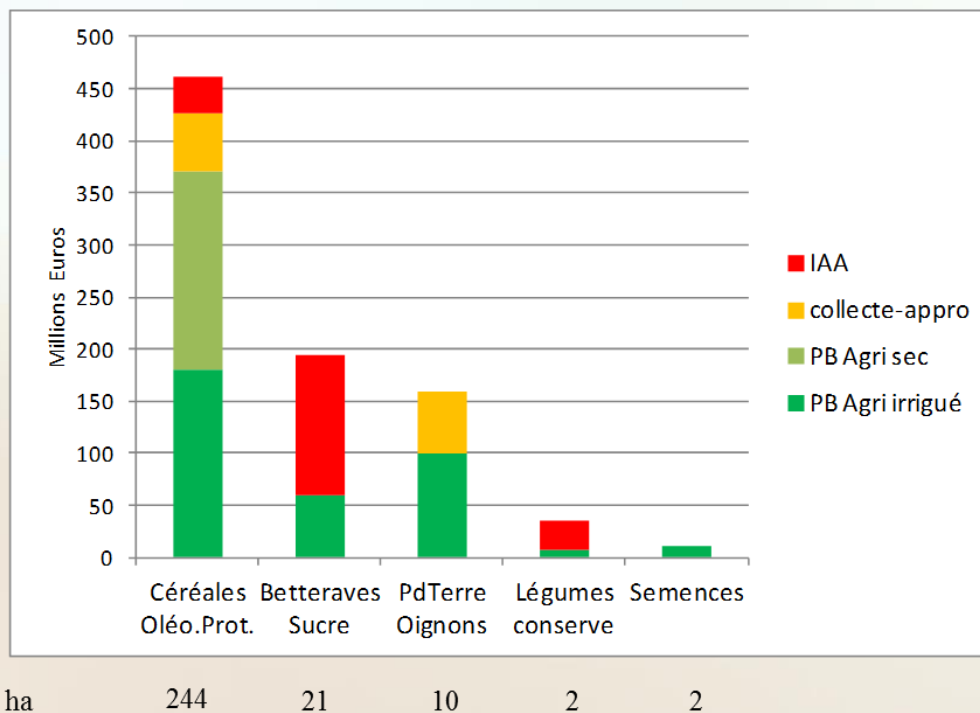
chain	Main constraints linked to irrigation
Céréals –oilseeds & pulses	irrigation as an « insurance» yield/ quality : malting barley & improved milling wheat
Sugar beet	Yield
Potatoes Onions	Irrigation essential Quality – harvest date
Vegetables for canning	Irrigation essential- contractual element Maturity & quality – harvest date- just in time delivery
Seeds	Irrigation essential – contractual element

Resource management of Beauce aquifer,

Integrate the agri-food chain stakes in water management process

5 Chains competing for the water resource with different stakes of irrigation: economic impacts

Produit brut Filières Beauce centrale = 860 M€ (PB agri x 1,6)



Favorable conditions in Beauce for water resource management

- a moderate pressure on water resource
comfortable water quota in normal years
- a strong organization of farmers used to be involved in concerted management process
- a recognition of different stakes of irrigation for industries
allows specific derogations to water restrictions

Conclusion

- Actors of agri-food chains are generally not directly associated to water resource management
- Individual choice of farmers for cropping pattern and irrigation practices can have strong impact, at aggregate level on supply and per so viability of downstream industries.
- Agro-industries have influence on irrigation practices through supply specification and contracts, they could provide leeways to irrigators to better manage and save water (choice of crop varieties, cropping calendars, insurance or services...)
=> an influent actor for water resource management